PSEG Nuclear LLC
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PSEG
Nuclear LLC

LR-N16-0075 10 CFR 50.73

April 14, 2016

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Salem Nuclear Generating Station Unit 2
Renewed Facility Operating License No. DPR-75
NRC Docket No. 50-311

SUBJECT: LER 311/2016-003-000
Automatic Reactor Trip due to Main Generator Protection Trip

Licensee Event Report, "Automatic Reactor Trip due to Main Generator Protection Trip" is being submitted pursuant to 10 CFR 50.73 (a)(2)(iv)(A), "Any event or condition that resulted in manual or automatic actuation of any of the systems listed in paragraph (a)(2)(iv)(B)."

Should you have any questions or comments regarding the submittal, please contact Mr. Thomas Cachaza of Regulatory Affairs at 856-339-5038.

There are no regulatory commitments contained in this letter.

Sincerely,

John F. Perry
Site Vice President – Salem Generating Station

pjd

Enclosure – LER 311/2016-003-000

cc Mr. D. Dorman, Administrator – Region 1, NRC
Mr. T. Wengert, Licensing Project Manager – Salem, NRC
Mr. P. Finney, USNRC Senior Resident Inspector, Salem (X24)
Mr. R. Braun, President and Chief Nuclear Officer – Nuclear
Mr. P. Mulligan, Manager IV, NJBNE
Bureau of Nuclear Engineering
PO Box 415
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Mr. T. Cachaza, Salem Commitment Tracking Coordinator
Mr. L. Marabella, Corporate Commitment Tracking Coordinator

NRC FORM 366 (02-2014) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 01/31/2017

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by Internet e-mail to Infocollects.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

(See Page 2 for required number of digits/characters for each block)

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
Salem Generating Station – Unit 2	05000311	1 OF 4

4. TITLE Automatic Reactor Trip due to Main Generator Protection Trip

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
										05000
02	14	2016	2016	003	000	04	14	2016	FACILITY NAME	DOCKET NUMBER 05000

9. OPERATING MODE	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: *(Check all that apply)*			
Mode 1	☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(i)(C)	☐ 50.73(a)(2)(vii)
	☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
	☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
	☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
10. POWER LEVEL	☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☒ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
100%	☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
	☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
	☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(C)	☐ OTHER
	☐ 20.2203(a)(2)(vi)	☐ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

LICENSEE CONTACT	TELEPHONE NUMER *(Include Area Code)*
Thomas J. Cachaza, Senior Regulatory Compliance Engineer	856 - 339 - 5038

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
X	TJ	V	WI65	Y					

14. SUPPLEMENTAL REPORT EXPECTED	15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR
☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☒ NO				

ABSTRACT *(Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)*

On 2/14/16 at 20:58 Salem Unit 2 automatically tripped from 100% power on Generator Protection. The trip was initiated due to a Main Turbine trip caused by a Main Generator Protection signal. All emergency core cooling systems and emergency safeguards feature systems functioned as expected. The motor driven and steam driven auxiliary feed pumps started as expected on steam generator low level. Operators stabilized the plant in Mode 3 with decay heat removal via the main steam dump valves and auxiliary feed water system. Condenser vacuum remained available for the duration of the event. Operators also ensured a normal offsite electrical power lineup. Investigation identified a Stator Water Cooling valve leak dripping onto a relay, shorting the relay wiring terminations. This caused the turbine generator trip.

This report is being made in accordance with 10CFR50.73 (a)(2)(iv)(A), "Any event or condition that resulted in manual or automatic actuation of any of the systems listed in paragraph (a)(2)(iv)(B)," for this event actuation of the Reactor Protection System and the Auxiliary Feedwater System.

NARRATIVE

PLANT AND SYSTEM IDENTIFICATION

Westinghouse-Pressurized Water Reactor {PWR/4}

Main Generator System/Relay {TB/RLY}

*Energy Industry Identification System (EIIS) codes and component function identifier codes appear as {SS/CCC}.

IDENTIFICATION OF OCCURRENCE

Event Date: 02/14/2016
Discovery Date: 02/14/2016

CONDITIONS PRIOR TO OCCURRENCE

Salem Unit 2 was in Mode 1 at 100 percent rated thermal power (RTP).

DESCRIPTION OF OCCURRRENCE

On 2/14/16 at 20:58 Salem Unit 2 automatically tripped from 100% power on Generator Protection. The trip was initiated due to a Main Turbine trip caused by a Main Generator Protection signal. All emergency core cooling systems and emergency safeguards feature systems functioned as expected. The motor driven and steam driven auxiliary feed pumps started as expected on steam generator low level. Operators stabilized the plant in Mode 3 with decay heat removal via the main steam dump valves and auxiliary feed water system. Condenser vacuum remained available for the duration of the event. Operators also ensured a normal offsite electrical power lineup.

Walk down of the Stator Water Cooling (SWC) Panel identified a SWC valve leak inside a panel that was dripping onto an agastat relay {TB/RLY}, shorting the wiring terminations for contact 1-5. The leak was noted at the packing associated with an equalizing valve. Water leaked from the valve down the panel, and into one of two Agastat Stator Water trip relays. The relay filled with water and internally shorted closing the normally open trip contact causing the generator to trip.

During the walkdown there were no other water leaks noted within the panel. It should be noted that the developed leak could be related to aging and usage over time which resulted in a loose valve packing nut. All other valves within the panel were verified to be wrench tight without signs of leaking and all tubing appeared to be visually intact without signs of leaking. The adjacent two

panels did not include electrical trip relays with process tubing, where a similar failure could cause a trip.

The Unit 1 Generator was walked down and it was noted that Stator water trip devices (pressure/flow) were non-panel mounted external units. Outside of the flow and pressure switches themselves, the Salem Unit 1 design differs from the Unit 2 tripping scheme using stand-alone devices. There were no active leaks noted at Salem Unit 1 at this time.

This report is being made in accordance with 10CFR50.73 (a)(2)(iv)(A), "Any event or condition that resulted in manual or automatic actuation of any of the systems listed in paragraph (a)(2)(iv)(B)," for this event actuation of the Reactor Protection System and the Auxiliary Feedwater System. Notification of this event was provided via ENS report 51734.

CAUSE OF EVENT

The direct cause for Salem Unit 2 turbine generator trip was a stator bushing cooling water flow switch equalizing valve leak that caused shorting of an agastat relay contact. Shorting this contact resulted in the turbine generator trip. The apparent cause of the generator trip is that the agastat relay had not been identified as a single point vulnerability. Therefore, the relay did not have a mitigation/elimination strategy.

SAFETY CONSEQUENCES AND IMPLICATIONS

There were no safety consequences as a result of this event. Operators appropriately responded to the reactor trip to stabilize the plant. All emergency core cooling systems and emergency safeguards feature systems functioned as expected. The motor driven and steam driven auxiliary feed pumps started as expected on steam generator low level. Operators stabilized the plant in Mode 3 with decay heat removal via the main steam dump valves and auxiliary feed water system. Condenser vacuum remained available for the duration of the event. Operators also ensured a normal offsite electrical power lineup.

SAFETY SYSTEM FUNCTIONAL FAILURE

This condition did not result a safety system functional failure as defined in NEI 99-02, Regulatory Assessment Performance Indicator Guidelines.

PREVIOUS EVENTS

A review of previous events for the past three years identified no similar events.

CORRECTIVE ACTIONS

- Prior to restarting the unit: the stator bushing cooling water flow switch equilizing valve leak was stopped; and the agastat relay was replaced.
- The agastat relay will be appropriately classified per the component classification process and a mitigation strategy will be developed in accordance with the system vulnerability review process.

COMMITMENTS

There are no regulatory commitments contained in this LER.